

A NEW SPECIES OF *EUXOA* (NOCTUIDAE) FROM WASHINGTON STATE

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ABSTRACT. *Euxoa emma* Crabo & Crabo, allied to *Euxoa annulipes* (Smith), is described from North Central Washington. It is the second member of the *annulipes* group of the subgenus *Euxoa*. Adults and genitalia of both species are illustrated.

Additional key words: Columbia Basin, endemic

An undescribed species of the genus *Euxoa* was discovered in 2004 from north central Washington state. It is superficially similar to *Euxoa annulipes* (Smith) and the two species are closely related based on similarity of the genitalia.

MATERIALS AND METHODS

Male and female genitalia dissections were performed using the methods of Lafontaine (1987).

Euxoa emma Crabo & Crabo, new species

(Figures 1, 3a-b, 4a)

Diagnosis. The male genitalia of the new species (Fig. 3a) differ from those of *annulipes* (Fig 3b) in several respects. The valves of *emma* are wider than those of *annulipes*. In *emma* the mean ratio of length to mesial width is 4.12 (range 3.96-4.35) compared to 4.70 (range 4.42-4.95) for *annulipes*. The sacculus of *emma* is shorter, the harpes are longer, and the saccular extensions tend to be shorter than those of *annulipes*.

The mean ratio of the lengths of either harpe to the ipsilateral sacculus length is 0.78 for *emma* (range 0.75-0.82) compared to 0.66 for *annulipes* (range 0.63-0.71).

In the female (Fig. 4a), the anterior apophyses of *emma* tend to be shorter than those of *annulipes* (Fig. 4b), although this difference is not consistent. Females are best identified by superficial appearance and association with the males.

The two species are superficially similar but there are several subtle differences. The forewing of *E. emma* is warmer cream colored and less gray than that of *annulipes*. It is also smoother appearing than that of *annulipes* due to the presence of fewer black scales. The forewing lines are more distinct in *E. emma* than in *annulipes*.

The two species can also be separated by locality. *Emma* occurs in northern Washington whereas *annulipes* is found south of east central Oregon.

Description. Head, thorax, and abdomen nearly concolorous, light grayish tan, a darker spot on the dorsum of abdominal segment VIII; frons with thin transverse black line dorsal to frontal tubercle; palpi with first and second segments covered with mixture of black



FIG. 1. Adult of *E. emma*. Holotype ♂. Washington, Ferry County



FIG. 2. Adult of *E. annulipes*. ♂. Oregon, Malheur County, Namorf.

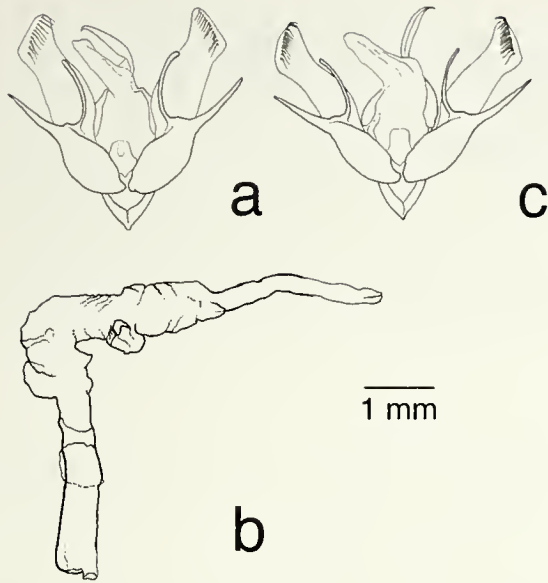


FIG. 3. Male genitalia. a) *E. emma* genital capsule b) *E. emma* aedeagus with everted vesica c) *E. annulipes* genital capsule

and grayish white scales, the third segment grayish white. Male antennae biserrate and bifasciculate; female filiform and ciliate ventrally; dorsal antenna of both sexes with two-toned light gray, dark gray to black tipped scales; scape grayish white. Legs proximal to tarsus grayish white to gray; tarsal segments black proximally and white distally, producing a striped appearance.

Forewing length: mean 14 mm, range 13-15 mm. Forewing with mixture of grayish white and light tan to reddish tan and occasional black and gray scales, appearing smooth light gray tan, a few specimens with warm red-brown suffusion, posterior margin and areas distal to postmedian line with variable darker gray suffusion (more in females), subterminal space darker gray than remainder of forewing, greatest on veins and darkest at costa, fringe ground color with two very faint gray lines. Basal, antemedian, median, and postmedian lines black, prominent at costa; basal line incomplete; antemedian line double with weak proximal component, toothed inwardly on veins, sometimes interrupted; median line most prominent, with convex contour below reniform spot; postmedian line double with weak distal component, prominently scalloped, toothed outwardly on veins; subterminal line faint, pale, evident mostly due to dark gray shading in adjacent spaces; terminal line a series of dark gray chevrons on veins. Claviform spot absent; orbicular spot pale gray white, barely traceable, evident mostly due to pale filling; reniform spot pale gray white, filled with pale gray and pale gray white scales. Hindwing ground color light gray white, terminal third, veins and discal spot darker gray, median line absent, fringe whitish.

Male genitalia (Fig 3a-b). Valves symmetrical, 4.12X as long as wide, wide mesially with convex dorsal margin, cucullus foot shaped with corona of 12-16 stout setae; sacculus 0.45X as long as valve and 2.1X as long as wide, oval, with convex dorsal margin; sacculus extensions cylindrical, asymmetrical, projecting slightly dorsad, the right 0.33X and the left 0.31X as long as the valves; harpes C-shaped, symmetrical, 0.78X as long as sacculus. Uncus relatively short, expanded mesially, with thin hooked apex. Juxta shield shaped. Aedeagus 4X as long as wide; vesica 1.9X length of aedeagus, bent 90° dorsad subbasally, bearing single subbasal, median, and very small apical diverticula.

Female genitalia (Fig 4a). Ovipositor lobes triangular, stout, 1X as long as wide, medial margins with a short sclerotized flange, lateral surfaces covered with short thin setae and base with skirt of innumerable long hairlike setae which cover the lobes. Abdominal

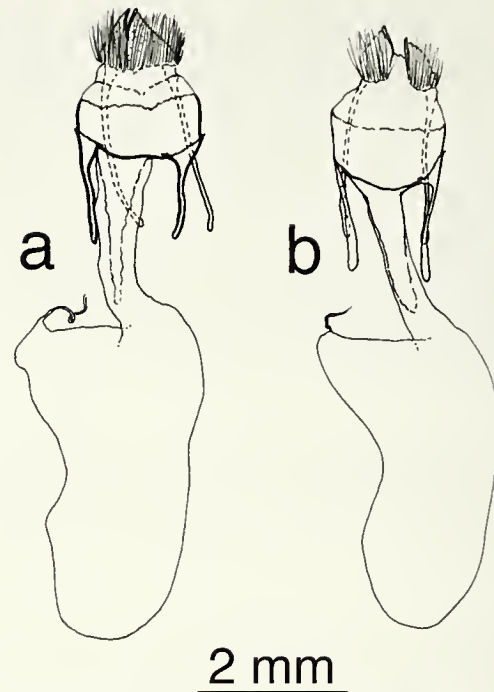


FIG. 4. Female genitalia. a) *E. emma* b) *E. annulipes*.

segment VIII short, 1X as long as ovipositor lobes; anterior apophyses 1.3X as long as abdominal segment VIII and posterior apophysis 3X as long as segment VIII. Ductus bursae 3X as long as wide and 3X as long as abdominal segment VIII, with dorsal and ventral sclerotized bands extending anteriorly from sclerotized ostium bursae. Bursa copulatrix unisaccate, 1.8X longer than the ductus bursae and 1.5X as long as wide, attached to ductus bursae at right posterior end and ductus seminalis at left posterior end.

Type Material. *Holotype*: ♂: WASHINGTON: Ferry Co., Lake Roosevelt S. Jim Mt, 47.900° N, 118.495° W, 24 June 2004, 2175', EK and LG Crabo, deposited in the Canadian National Collection (CNC), Ottawa, Ontario, Canada. *Paratypes*: 31 ♂, 10 ♀. Same data as holotype (21 ♂, 5 ♀); same locality and collectors as holotype, 6 July 2005 (10 ♂, 5 ♀). The paratypes are deposited in the CNC and the personal collection of Lars Crabo. Additional paratypes will be distributed to Washington State University, Pullman, Washington and the United States National Museum, Washington D. C.

Distribution and Biology. *E. emma* is known only from the type locality in Washington. It is a south facing slope near the Columbia River (Lake Roosevelt) with rocky outcrops. The rocks at this location are metamorphic (Stoffel et al 1991), not basalt which covers most of central Washington. The vegetation is sparse ponderosa pine (*Pinus ponderosa* Dougl. (Pinaceae)) forest with antelope brush (*Purshia tridentata* (Pursh) (Rosaceae)) understory.

The type series was collected at light in late June.

The early stages of *E. emma* are unknown.

Etymology. *Euxoa emma* is named in honor of Emma Crabo, the authors' youngest family member and an eager camper and moth collector. Emma helped to collect the type series and was directly responsible for

selecting the collecting site. Without her, this species might never have been discovered.

DISCUSSION

Euxoa is a very large genus of drably colored medium sized moths. Most species occur in dry temperate habitats, often open forests or steppe. Over three hundred species occur world wide, with over 175 in North America (Lafontaine 1987). Nearly one hundred of these occur in the Pacific Northwest. The North American *Euxoa* were revised by Lafontaine (1987), who defined subgenera and species groups.

E. emma is the second member of the *annulipes* species group in the subgenus *Euxoa*. This group is defined by characters of the male genitalia, specifically the hook shaped uncus, oval sacculus, and pincer-like harpe and saccular extension (Lafontaine 1987). The distributions of these two species are disjunct. *E. emma* occurs several hundred miles north of the range of *annulipes*. The latter is found in the intermountain West north to the Burnt River in east-central Oregon.

E. emma is endemic to Washington as it is known only from the type locality. The Columbia Basin region has several other endemic noctuid taxa, including

Copablepharon mutans Crabo & Lafontaine, *C. columbia* Crabo & Lafontaine, *C. spiritum spiritum* Crabo & Fauske, *C. viridisparsa hopfingeri* Franclemont, and *Oncocnemis parvacana* Troubridge & Crabo. These are restricted to sand habitats, particularly dunes. *E. emma* is the only endemic species not restricted to sand and might therefore be more widely distributed. It should be sought at other locations in northern Washington and southern British Columbia, particularly in rocky habitats along the Columbia River.

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